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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1746	

DATE MAILED: 02/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/747,627	YAMADA ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4 and 6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4 and 6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1, 4, and 6. The claims, although they have been amended, remain rejected for substantially the reasons of record. Accordingly, this action is made final.

Claim Rejections - 35 USC § 103

2. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsufuji et al (U.S. Patent 5,759,714) in view of Kato et al (U.S. Patent 6,150,055), in further view of Beauchamp (U.S. Patent 4,228,228) and Iijima et al (U.S. Patent 6,300,012).

Regarding claim 1, the patent of Matsufuji et al. is directed to a nonaqueous lithium secondary battery (see abstract). The negative electrode comprises a mixture of a non-carbon material (e.g., a composite tin oxide) and a carbon material (e.g., graphite; see col. 12, line 13; col. 13, line 4 et seq.; the Example). The tin oxide is made by a crushing and classification process (see col. 12, line 12 et seq.). The tin oxide and carbon material are mixed to form a negative electrode composition and then coated on a negative electrode current collector (see col. 17, line 26 to col. 18, line 4). The coated negative electrode composition is then dried in a low-humidity air (see col. 14, line 39). Regarding claim 4, the negative electrode mixture is then hot-pressed to form a sheet (see col. 14, lines 47-54). Regarding the recitation in claim 1 that the

ratio of W_M (the weight of non-carbon material) to W_C (the weight of carbon material) is less than or equal to 1, the reference teaches in column 13, line 24 that "the amount of the conducting agent to be added to the composition layer is preferably 6 to 50 wt. %, and particularly preferably 6 to 30 wt. %, based on the negative electrode or positive electrode material." This disclosure fairly suggests a situation wherein the conductive material (i.e., carbon) makes up half the negative electrode mixture by weight. In this case, the ratio W_M/W_C would be equal to 1 since the non-carbon material and the carbon material would be present in equal proportions. Accordingly, the claimed range is fairly suggested by the reference.

Matsufuji et al. do not expressly teach that the ratio of an average particle size of the non-carbon material to an average particle size of the carbon material is less than or equal to 1, as recited in claim 1. The reference further does not teach that the carbon material is also crushed and classified, or that both materials are crushed and classified in an inert or dry air atmosphere. The reference further does not teach that the mixing, coating, and hot-pressing steps are performed in an inert or dry air atmosphere.

The disclosure of Kato et al. relates to nonaqueous lithium secondary batteries. In column 3, line 7 et seq., the reference teaches that a carbonaceous negative electrode is pulverized and classified.

The artisan would be motivated by the disclosure of Kato et al. to perform pulverizing and classifying steps on the carbon material of Matsufuji et al. because in column 3, line 12, Kato et al. teach that "pulverization prior to heat treatment is important." Accordingly, the

artisan would be motivated to carry out pulverization and subsequent classification steps during the processing of the carbon material of Matsufuji et al.

Additionally, the Beauchamp reference discloses a lithium battery in column 4, line 11. In column 3, line 35 et seq., the reference teaches that "if highly reactive electrode materials are present, the preparation is carried in the absence of air and moisture, usually in a dry box under an inert atmosphere."

The artisan would be motivated by the disclosure of Beauchamp to carry out all of the pulverizing, classifying, mixing, coating, and hot-pressing steps of Matsufuji et al. in an inert atmosphere because as noted above, Beauchamp states that "reactive" electrode materials must be processed in such an inert atmosphere. The artisan would recognize that the materials of Matsufuji et al. are indeed "reactive," because they tend to undesirably adsorb water from the air. This is a known problem in the nonaqueous lithium battery art, and is recognized by Matsufuji et al. at column 14, line 41 et seq. Therefore, the artisan would be sufficiently motivated to perform the pulverizing and classifying steps of the carbon and non-carbon materials of Matsufuji et al., in addition to the mixing, coating, and hot-pressing of the negative electrode, in an inert atmosphere.

The patent of Iijima et al. is also directed to nonaqueous cells. In the abstract, the reference teaches that an electrode comprises an active material and flake graphite, wherein the central particle size of the graphite is larger than that of the active material. The active material may be tin oxide (see col. 4, line 31).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Iijima et al. to use an average particle size of the graphite of Matsufuji et al. which is larger than that of the non-carbon active material, thereby falling within the instantly claimed range. In column 2, line 20, Iijima et al. teach that this configuration "provides an electrode for a non-aqueous electrolytic cell having good charge and discharge characteristics such as discharge capacity and charge and discharge cycle life, and improved in physical characteristics." Accordingly, the artisan would be motivated to use an average particle size of the graphite of Matsufuji et al. which is larger than that of the non-carbon active material, thereby falling within the claimed range.

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasunami (U.S. Patent 6,371,995) in view of Watanabe et al (U.S. Patent 6,083,644), in further view of Iijima et al.

Yasunami is generally directed to a nonaqueous lithium secondary battery. The negative electrode comprises a mixture of a lithium-occluding non-carbon material (e.g., a composite tin oxide) and a carbon material (e.g., graphite; see col. 19, lines 25-30), and the positive electrode comprises a lithium composite oxide. In the abstract, the reference teaches that the positive electrode sheet, negative electrode sheet, and separator are wound into a battery can, and

electrolyte is injected (i.e., poured) into the can. Regarding the recitation in claim 6 that the ratio $W_M/W_C \leq 1$, the reference teaches in column 13, line 31 that "the amount of these electrically-conductive materials to be incorporated is preferably 1 to 50% by weight, and more preferably from 2 to 30% by weight, particularly from 2 to 15% by weight if they are carbon black or graphite." This disclosure fairly suggests a situation wherein the conductive material (i.e., carbon) makes up half the negative electrode mixture by weight. In this case, the ratio W_M/W_C would be equal to 1 since the non-carbon material and the carbon material would be present in equal proportions. Accordingly, the claimed range is fairly suggested by the reference.

Yasunami does not expressly teach that the winding and pouring steps are performed in an inert or dry air atmosphere, or that the ratio of an average particle size of the non-carbon material to an average particle size of the carbon material is less than or equal to 1.

Watanabe is generally directed to a nonaqueous lithium secondary battery. In column 14, lines 38-40, the reference teaches that the battery is assembled in a moisture-free or inert gas atmosphere.

The artisan would be motivated by the disclosure of Watanabe et al. to assemble (i.e., perform the winding and pouring steps) the battery of Yasunami in an inert gas atmosphere because in the cited passage, Watanabe teaches that this is "desirable," and further teaches that it is "preferred...from the point of cycle property" if the electrodes have a water content of less than 50 ppm. Accordingly, the artisan would be motivated to perform the winding and pouring steps of Yasunami in an inert gas atmosphere.

The patent of Iijima et al. is also directed to nonaqueous cells. In the abstract, the reference teaches that an electrode comprises an active material and flake graphite, wherein the central particle size of the graphite is larger than that of the active material. The active material may be tin oxide (see col. 4, line 31).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Iijima et al. to use an average particle size of the graphite of Yasunami which is larger than that of the non-carbon active material, thereby falling within the instantly claimed range. In column 2, line 20, Iijima et al. teach that this configuration "provides an electrode for a non-aqueous electrolytic cell having good charge and discharge characteristics such as discharge capacity and charge and discharge cycle life, and improved in physical characteristics." Accordingly, the artisan would be motivated to use an average particle size of the graphite of Yasunami which is larger than that of the non-carbon active material, thereby falling within the claimed range.

Response to Arguments

4. Applicant's arguments filed December 19, 2003 have been fully considered but they are not persuasive. Applicants assert that "none of the cited references, taken singly or in combination, discloses or suggests Applicants' claimed ratio of material weights $W_M/W_C \leq 1$." However, it is believed that the Matsufuji and Yasunami references do in fact fairly suggest the claimed ranges by virtue of their teachings of 50 wt% conductive material in the electrode

material. Accordingly, these ranges are not considered to patentably distinguish over the references.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: JP 3-22369, which relates to manufacturing a battery in a nitrogen or inert gas atmosphere.

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Jonathan Crepeau
Patent Examiner
Art Unit 1746
February 3, 2004

Bruce Bell
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